Finally, from each, unit of weight of Si02 which independently reaches the slag, there is, according to (40), 4'78 per cent, of final slag . . . (48A).
The manganese content of the charge does not require to be taken into consideration in the calculation of the quantity of slag, since the manganese protoxide originated from it is already contained in the silicate slag.
(h.) CHARGE SHRINKAGE.
The removal of the reducing agents from iron causes naturally a diminution of the weight of metal, or charge shrinkage. The extent of this is, however, not simply equal to the amount of the reducing agents eliminated, but these are accompanied by such quantities of iron as go into the slag in combination with oxygen. The iron oxides in the slag can, of course, partly come from the auxiliary materials, for example, the hearth, but the quantities of iron from thene sources are often extremely small, and it appears more useful to regard them in calculations as completely derived from the metallic charge.
From this it is indicated that the quantity of slag is dependent on the kind of reducing agents employed, and, therefore, admits shrinkage being brought into relation with these agents. Were it assumed in the calculation of the quantity of slag that the carbon content in the metal, in consequence of the wear of the furnace structure, yielded 2*15 per cent, slag, it is now further known that this slag must contain 10 per cent, of iron, which thus is 2'15xO'l=0'2 per cent. taken on the metallic weight. The loss which originates owing to the elimination of the carbon content is, therefore =C+0'2 per cent. . . . (44). A silicon content of 1 per cent, yields from (42) 10-28 per cent, final slag, in which the Fe is 10 per cent.=about 1*0 per cent, on the charge, and thus loss which must result owing to an impurity of 1 per cent. Si must amount to 1 per cent.Si+1 per cent. Fe= 2 per cent. . . . (45).
A silica content of the charge, or of the excess materials added, gives rise for each kilogramme of Si02 according to (40) to an amount of slag of 4*78 kilogrammes; this contains